Don

PCT/GB 00/03639

22 SEPTEMBER 2000

INVESTOR IN PEOPLE

PATENTS • DESIGNS • The Patent Office • COPYRIGHT • TRADE MARKS

GB00/03639

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

REC'D 16 OCT 2000
WIPO PCT

#2

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

PRIORITY DOCUMENT

SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

Signed Andrew Gersey

Dated 29 September 2000

Patents Act 1977
(R 16)

The Patent Office

9922641.7 77

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

25 SEP 1999

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference — P239

2. Patent application number *(The Patent Office will fill in this part)* — 27SEP99 E479319-1 C04954 P01/7700 0.00 - 9922641.7

3. Full name, address and postcode of the or of each applicant *(underline all surnames)* — Anthony George Standfast PIPERof 3 Highfield Road, London, W3 0AJ; and Roderick Nigel JONES of 121 Goldhawk Road, London, W12 8EN

Patents ADP number *(if you know it)* — 07749016001 07749021001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention — FLY TRAP

5. Name of your agent *(if you have one)* — David Pratt & Co

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)* — 7 Parkhill Road
Sidcup
Kent
DA15 7NW

Patents ADP number *(if you know it)* — 03919747001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(answer 'Yes' if:*
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d)) — NO

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	8
Claim*(s)*	4
Abstract	1
Drawing *(s)*	3

10. If you are also filing any of the following, state how many against each item.

Priority documents	no
Translations of priority documents	no
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	no
Request for preliminary examination and search *(Patents Form 9/77)*	yes
Request for substantive examination *(Patents Form 10/77)*	no
Any other documents *(please specify)*	Patents Form 9/77 for invention of claims 25 to 33

11. I/We request the grant of a patent on the basis of this application.

Signature David Pratt & Co   Date 24.9.99

12. Name and daytime telephone number of person to contact in the United Kingdom   David M Pratt   020 8308 1961

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least six weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500 505.*
b) *Write your answers in capital letters using black ink or you may type them.*
c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*
d) *If you have answered 'Yes' Patents Form 7/77 will need to be filed.*
e) *Once you have filled in the form you must remember to sign and date it.*
f) *For details of the fee and ways to pay please contact the Patent Office.*

FLY TRAP

The present invention relates to a trap for flying insects.

Flying insects are a nuisance, and in many cases a health hazard. Various means are employed to kill them. A common method is to use ultraviolet light to attract flying insects to a high voltage electrocution grid, or to an adhesive trapping board. Electrocution grids and their associated electrical components involve a high capital cost, while adhesive boards have a limited effective life, are expensive and need to be replaced frequently.

The aim of the invention is to provide a trap for flying insects which is economic to produce and maintain, and which does not suffer from the disadvantages of known traps. Such a trap will be called a fly trap throughout this specification, though it will be appreciated that the trap can be used to trap and kill other types of flying insect which are attracted by light.

The present invention provides a fly trap comprising a casing having an open end and a closed end, a light source, and a lid substantially closing the open end of the casing, the lid tapering from a first cross-section which matches that of the open end of the casing to a second cross-section which defines a fly entry port leading into the interior of the casing, wherein the lid is made of a material that is substantially transparent to light having the frequency of the light source, and the light source is positioned so as to be visible from the open end of the casing through the lid.

Advantageously, the light source is positioned within the casing. Alternatively, the light source is positioned outside the casing, and the trap is provided with optical means for directing light from the light source through the lid via the interior of the casing.

Preferably, the lid is generally frustoconical in configuration.

In a preferred embodiment, the lid is fixed to the open end of a housing, the housing having a cross-section which complements that of the casing in such a manner that the housing is a close fit within the casing at least at the open end

of the casing, the lid tapering towards a closed end of the housing, and the closed end of the housing being positioned adjacent to the closed end of the casing.

Advantageously, the lid is integrally formed with the housing, and the lid and the housing are made of a material transparent to light having the frequency of the light source. Preferably, the interior of the housing defined by the internal surfaces of the lid, the closed end of the housing and the housing walls constitutes a chamber for receiving flying insects that enter via the entry port.

Preferably, the light source is positioned between the closed end of the housing and the closed end of the casing. The light source may be an ultraviolet light source.

The casing conveniently has a generally square cross-section, and the lid takes the form of a square-based pyramid. Alternatively, the entry port takes the form of an elongate opening defined by tapering portions of the lid and internal side walls of the casing.

Advantageously, the casing is made of a material that is substantially opaque to light having the frequency of the light source, and the lid is made of a an acrylic plastics material transparent to light having the frequency of the light source.

In a preferred embodiment, the fly trap further comprises means for deterring flying insects from leaving the interior of the trap via the entry port, said deterrent means being positioned within the casing adjacent to the entry port. Preferably, the deterrent means is constituted by a plurality of substantially parallel electrodes, adjacent electrodes being of opposite polarity, and the electrodes being spaced apart in such a manner that flying insects of species commonly regarded as pests can simultaneously touch at least two electrodes of opposite polarity on coming into contact with the deterrent means.

The invention also provides a device for deterring flying insects, the device comprising a grid constituted by a plurality of substantially parallel electrodes, adjacent electrodes being of opposite polarity, and the grid being such

that the electrodes are spaced apart in such a manner that flying insects of species commonly regarded as pests can simultaneously touch at least two electrodes of opposite polarity on coming into contact with the grid.

Advantageously, the electrodes are spaced apart by a distance lying within the range of from 0.5 mm to 2.5 mm, and preferably the electrode spacing is substantially 1 mm. Also, the width of each of the electrodes may lie within the range of from 0.5 mm to 2.5 mm, and preferably the width of each electrode is substantially 1 mm.

Conveniently, the electrodes are provided with means for connection to an alternating current mains supply.

The device may further comprise current limiting means for limiting the current supplied to the electrodes. Preferably, the current limiting means is such that flying insects that contact the deterrent means are stunned or disorientated.

In another embodiment, the trap is generally cylindrical in configuration, the lid tapers from a generally cylindrical outer shape to a generally annular shape that defines the entry port, and the light source is positioned generally axially and coaxial with the entry port.

Several forms of fly trap, each of which is constructed in accordance with the invention, will now be described in greater detail, by way of example, with reference to the drawings, in which:

Figure 1 is a schematic sectional side view of the first form of fly trap;

Figure 2 is a perspective view of a trapping chamber forming part of the trap of Figure 1;

Figure 3 is a schematic representation, on an enlarged scale, of a stunning grid which can be incorporated within the trap of Figure 1;

Figure 4a is a schematic side elevation of the second form of fly trap;

Figure 4b is a schematic front elevation of the fly trap of Figure 4a;

Figure 5a is a schematic side elevation of the third form of fly trap;

Figure 5b is a schematic front elevation of the fly trap of Figure 5a;

Figure 6 is a schematic side elevation of the fourth form of fly trap;

Figure 7 is a perspective view of part of the fly trap of Figure 6;

Figure 8 is a plan view of the fly trap of Figure 6; and

Figure 9 is a plan view of a modified version of the fly trap of Figure 6.

Referring to the drawings, Figure 1 shows the first form of fly trap which has a trapping chamber 1 and an ultraviolet light source 2 mounted within an outer casing 3. The ultraviolet light source 2 is mains powered, and is provided with conventional connection means (not shown) for its electrical connection to the mains. The trapping chamber 1 is made of a material such as an acrylic which is transparent to ultraviolet light, and the outer casing is made of a material such as ABS which is opaque to ultraviolet light. The acrylic material is not only transparent to ultraviolet light, but is also resistant to ultraviolet, that is to say it is resistant to degradation by ultraviolet light. The chamber 1 is generally cuboidal with an open end 1a. A flange 1b, generally in the form of a square-based pyramid with an open base, extends into the chamber 1 from the open end 1a. The narrow end of the pyramid-shaped flange 1b is open to define an entry port 4. The interior 5 of the chamber 1 forms a receptacle for holding trapped flies.

In use, the ultraviolet light source 2 is turned on to attract flies into the interior 5 of the chamber 1 via the narrow entry port 4. Once in the chamber interior 5, flies find it difficult to escape via the narrow port 4. Although trapped flies will eventually die inside the chamber 1, means are preferably provided to accelerate the dying process. For example, a renewable desiccant can be provided within the chamber interior 5, the desiccant being effective to accelerate dehydration of trapped flies, thereby accelerating their death. Preferably, however, an electrified stunning grid 6 is positioned within the chamber interior 5 adjacent to the port 4.

The grid 6 is shown in Figure 3, and is constituted by a series of parallel, adjacent electrodes 7 and 8 of opposite polarities. The electrodes 7 are electrically connected by means of a base plate 7a, and the electrodes 8 are electrically

connected by means of a base plate 8a. The electrodes 7 and 8 are connectible to the mains by means of contacts 7b and 8b. The mains voltage may be any normal mains voltage such as 110 volts or 240 volts, alternating at normal frequencies of 50 Hz to 60 Hz. Preferably, the current applied to the grid 6 is limited by means of a suitable current-limiting device (not shown) which limits the current to an appropriate value (for example 5 mA). The electrodes 7 and 8 are sized and spaced so that flying insects of species commonly regarded as pests will simultaneously touch at least a pair of electrodes 7 and 8 of opposite polarity, on coming into contact with the grid 6. Typically, the electrodes 7 and 8 have a width of 1 mm, and a spacing of 1 mm.

The electrodes 7 and 8 are made of a suitable metal, such as stainless steel , and may be supported by a non-conducting substrate made of, for example, fibreglass. Alternatively, the electrodes could be deposited onto the chamber 1, for example by electrodeposition. Being made of stainless steel, the electrodes 7 and 8 are resistant to oxidation, and to degradation from the effects of humidity and/or chemicals from the trapped insects.

This simple grid 6 has a distressing affect on insects, which find contact with it unsustainable. They either fly off in a state of disorganisation or fall to the floor of the trap, temporarily stunned. Contact with the grid 6 causes damage, and repeated contact will have a cumulative effect, leading to accelerated death. It does not, in itself, prevent random escape by disorientated and/or partially recovered insects. However, as the grid 6 is sited round the port 4, random escape is prevented by deterring access to the narrow mouth of the port.

Figures 4a and 4b show the second form of fly trap. This trap is a modified version of the trap of Figures 1 to 3, so like reference numerals will be used for like parts, and only the modifications will be described in detail. This trap differs from that of Figures 1 to 3 in that the casing 3 and the trapping chamber 1 are asymmetrical, the casing having a lower front wall 3a that has a greater height than its upper front wall 3b. Similarly, the chamber 1 has a lower front wall 1c,

which contrasts with the upper front end 1d of the chamber which is pointed. The lower casing wall 3a covers the lower chamber wall 1c. One advantage of this arrangement is that the lower portion of the chamber 1 is larger than that of the trap of Figures 1 to 3, and so can hold a larger number of dead insects.

The other difference between this trap and the first form of trap is that the trap of Figures 4a and 4b has two ultraviolet sources 2.

The third form of trap, shown in Figures 5a and 5b, is identical to that of Figures 4a and 4b except that it has an elongate entry port 4 instead of a square entry port, and the chamber 1 is not frustoconical, the vertical components of the flange 1b being omitted and the entry port being defined by the horizontal components of the flange and the side walls of the casing 3.

The trap of Figure 6 has a trapping chamber 11 of generally cylindrical configuration, and includes a cylindrical side opening 11a and tapering flanges 11b whose inner ends define an annular entry port 14. An ultraviolet light source 12 is positioned within a channel formed by a cylindrical internal wall 11c of the chamber 11. The chamber 11 is mounted between two end plates 15 and 16 which, together with an upstanding cylindrical wall 17 integrally formed with the end plate 16, define a casing 13.

As with the earlier embodiments, the trapping chamber is made of an acrylic which is transparent to ultraviolet light, and the casing 13 is made of ABS which is opaque to ultraviolet light.

This trap operates in the same manner, and has similar advantages to, the traps of Figures 1 to 5.

This trap can be of modular construction, as shown in Figure 9, which shows the trapping chamber 11 formed from four quadrants 11A, 11B, 11C and 11D, and with four ultraviolet light sources 12, each of which is positioned in a respective quadrant-shaped channel at the "apex" of the associated quadrant. The trap could be used in this configuration, or it could incorporate one, two or three of the quadrants. For example, where a trap is to be positioned in the corner of a

room, it could have only one trapping chamber quadrant.

Obviously, the fly traps of Figure 4 to 9 could be modified to incorporate a grid similar to the grid 6, though this would need to be configured, in each case, to the shape of the entry port 4 or 14.

The fly traps described above have considerable advantages over known traps. They are cheaper to manufacture and more effective than known electrocuting fly traps, and cheaper to run than traps utilising replaceable adhesive boards. They are also more effective than known traps, in that they retain all the insects they attract - electrocuting fly traps only work with larger flying insects, and adhesive board traps only trap a proportion of the insects attracted. Unlike electrocuting fly traps, the traps described above do not eject fragments of trapped and killed insects, and so are suitable for use in the proximity of food.

It will be apparent that modifications could be made to the traps described above. Thus, the ultraviolet light sources 2 or 12 could be replaced by different light sources, though ultraviolet light is preferred as it is more attractive to flying insects. In this case, the chamber 1 or 11 would be made of a material transparent to light of the appropriate frequency, and the outer casing 3 or 13 would be made of a material opaque to light of that frequency. The flange 1b or 11b could be of any frustoconical shape, and could be regular, irregular or asymmetric in cross-section. It would also be possible to position the light source(s) 2 or 12 outside the casing 3 or 13, and to provide the casing with lenses, prisms or other optical devices to direct light from the source through the interior of the trap and out through the flange 1b or 11b.

The grid 6 could also be electrified with any voltage at which current will pass through an insect at a sufficient level to disorientate, damage or otherwise discourage it from remaining on the grid. Similarly, frequencies other than those normally used for a mains supply could be used. It would also be possible to use alternating currents having waveforms other than sinusoidal. Direct current or pulsed direct current could also be used, though steady direct

current may be less effective, in that it may cause insects to stick to the grid 6, rather than be jolted off or leap/fly away. This could clog the grid 6 and lead to the possibility of a carbonised link creating a short circuit. Direct current would, therefore, lead to the need for the grid 6 to be cleaned frequently.

It would also be possible to provide that portion of the outer casing 3 or 13 adjacent to the light source(s) 2 or 12 with ventilation holes for cooling the light source(s) and the body of the trap. Such ventilation holes would be provided with baffles to prevent the light source(s) 2 or 12 from being seen from outside the trap through the ventilation holes. The chamber 1 or 11 and the casing 3 or 13 could be of modular construction, thereby permitting traps of different sizes to be made from a small number of basic components. The casing 3 or 13 may be provided with a removable tray for facilitating the removal of dead insects. Alternatively, a door or a removable portion of the trapping chamber may facilitate this. The easy removability of the trapping chamber 1 or 11 from the outer casing 3 or 13 facilitates access to the interior of the trap for cleaning purposes. Another possibility would be to make the trapping chamber from a disposable material such as paper which is at least partially transparent to light having the frequency of the light source.

Also, the electrodes 7 and 8 could be made of a non-metallic conductor such as carbon. Finally, the grid 6 could be replaced, or supplemented, by the use of a renewable desiccant or other means for accelerating the death of trapped insects such as heat, infrared radiation or an appropriate electromagnetic field for affecting the nervous system of the insects. If a heat source is used, care must be taken that it is not too intense as to raise the temperature of the trap itself to an undesirable extent.

Claims:

1. A fly trap comprising a casing having an open end and a closed end, a light source, and a lid substantially closing the open end of the casing, the lid tapering from a first cross-section which matches that of the open end of the casing to a second cross-section which defines a fly entry port leading into the interior of the casing, wherein the lid is made of a material that is substantially transparent to light having the frequency of the light source, and the light source is positioned so as to be visible from the open end of the casing through the lid.

2. A fly trap as claimed in claim 1, wherein the light source is positioned within the casing.

3. A fly trap as claimed in claim 1, wherein the light source is positioned outside the casing, and the trap is provided with optical means for directing light from the light source through the lid via the interior of the casing.

4. A fly trap as claimed in any one of claims 1 to 3, wherein the lid is generally frustoconical in configuration.

5. A fly trap as claimed in any one of claims 1 to 4, wherein the lid is fixed to the open end of a housing, the housing having a cross-section which complements that of the casing in such a manner that the housing is a close fit within the casing at least at the open end of the casing, the lid tapering towards the a closed end of the housing, and the closed end of the housing being positioned adjacent to the closed end of the casing.

6. A fly trap as claimed in claim 5, wherein the lid is integrally formed with the housing, and the lid and the housing are made of a material transparent to light having the frequency of the light source.

7. A fly trap as claimed in claim 5 or claim 6, wherein the interior of the housing defined by the internal surfaces of the lid, the closed end of the housing and the housing walls constitutes a chamber for receiving flying insects that enter via the entry port.

8. A fly trap as claimed in any one of claims 5 to 7, wherein the light

source is positioned between the closed end of the housing and the closed end of the casing.

9. A fly trap as claimed in any one of claims 1 to 8, wherein the light source is an ultraviolet light source.

10. A fly trap as claimed in any one of claims 1 to 9, wherein the casing has a generally square cross-section, and the lid takes the form of a square-based pyramid.

11. A fly trap as claimed in claim 1, claim 2, or in any one of claims 5 to 9 when appendant to claim 1 or claim 2, wherein the entry port takes the form of an elongate opening defined by tapering portions of the lid and internal side walls of the casing.

12. A fly trap as claimed in any one of claims 1 to 11, wherein the casing is made of a material that is substantially opaque to light having the frequency of the light source.

13. A fly trap as claimed in any one of claims 1 to 12, wherein the lid is made of an acrylic plastics material transparent to light having the frequency of the light source.

14. A fly trap as claimed in any one of claims 1 to 5, wherein the trap is generally cylindrical in configuration, the lid tapers from a generally cylindrical outer shape to a generally annular shape that defines the entry port, and the light source is positioned generally axially and coaxial with the entry port.

15. A fly trap as claimed in any one of claims 1 to 14, further comprising means for deterring flying insects from leaving the interior of the trap via the entry port, said deterrent means being positioned within the casing adjacent to the entry port.

16. A fly trap as claimed in claim 15, wherein the deterrent means is constituted by a plurality of substantially parallel electrodes, adjacent electrodes being of opposite polarity, and the electrodes being spaced apart in such a manner that flying insects of species commonly regarded as pests can simultaneously

touch at least two electrodes of opposite polarity on coming into contact with the deterrent means.

17. A fly trap as claimed in claim 16, wherein the electrodes are spaced apart by a distance lying within the range of from 0.5 mm to 2.5 mm.

18. A fly trap as claimed in claim 17, wherein the electrode spacing is substantially 1 mm.

19. A fly trap as claimed in any one of claims 16 to 18, wherein the width of each of the electrodes lies within the range of from 0.5 mm to 2.5 mm.

20. A fly trap as claimed in claim 19, wherein the width of each of the electrodes is substantially 1 mm.

21. A fly trap as claimed in any one of claims 16 to 20, wherein the electrodes are provided with means for connection to an alternating current mains supply.

22. A fly trap as claimed in claim 21, further comprising current limiting means for limiting the current supplied to the electrodes.

23. A fly trap as claimed in claim 22, wherein the current limiting means is such that flying insects that contact the deterrent means are stunned or disorientated.

24. A fly trap substantially as hereinbefore described with reference to, and as shown by, Figures 1 to 3, Figures 4a and 4b, Figures 5a and 5b, Figures 6 to 8, or Figures 6 to 8 as modified by Figure 9 of the drawings.

25. A device for deterring flying insects, the device comprising a grid constituted by a plurality of substantially parallel electrodes, adjacent electrodes being of opposite polarity, and the grid being such that the electrodes are spaced apart in such a manner that flying insects of species commonly regarded as pests can simultaneously touch at least two electrodes of opposite polarity on coming into contact with the grid.

26. A device as claimed in claim 25, wherein the electrodes are spaced apart by a distance lying within the range of from 0.5 mm to 2.5 mm.

27. A device as claimed in claim 26, wherein the electrode spacing is substantially 1 mm.

28. A device as claimed in any one of claims 25 to 27, wherein the width of each of the electrodes lies within the range of from 0.5 mm to 2.5 mm.

29. A device as claimed in claim 28, wherein the width of each of the electrodes is substantially 1 mm.

30. A device as claimed in any one of claims 25 to 29, wherein the electrodes are provided with means for connection to an alternating current mains supply.

31. A device as claimed in claim 30, further comprising current limiting means for limiting the current supplied to the electrodes.

32. A device as claimed in claim 31, wherein the current limiting means is such that flying insects that contact the deterrent means are stunned or disorientated.

33. A flying insect deterrent device substantially as hereinbefore described with reference to, and as shown by, Figure 3 of the drawings.

FLY TRAP

Abstract

A fly trap comprises a casing (3) having an open end and a closed end, a light source (2), and a lid(1) substantially closing the open end of the casing. The lid (1) tapers from a first cross-section which matches that of the open end of the casing to a second cross-section which defines a fly entry port (4) leading into the interior of the casing (3). The lid (1) is made of a material that is substantially transparent to light having the frequency of the light source (2), and the light source is positioned so as to be visible from the open end of the casing (3) through the lid.

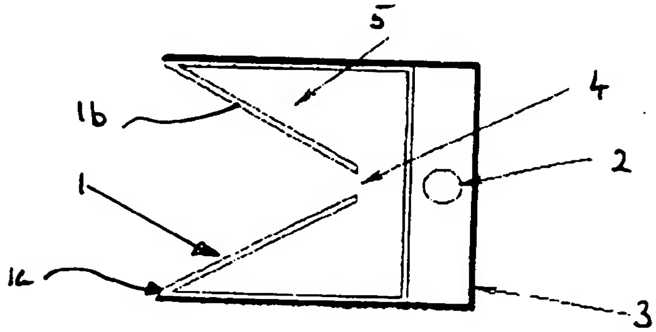


Fig.1

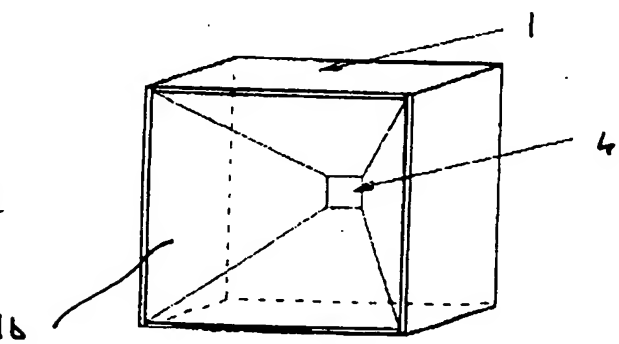


Fig.2

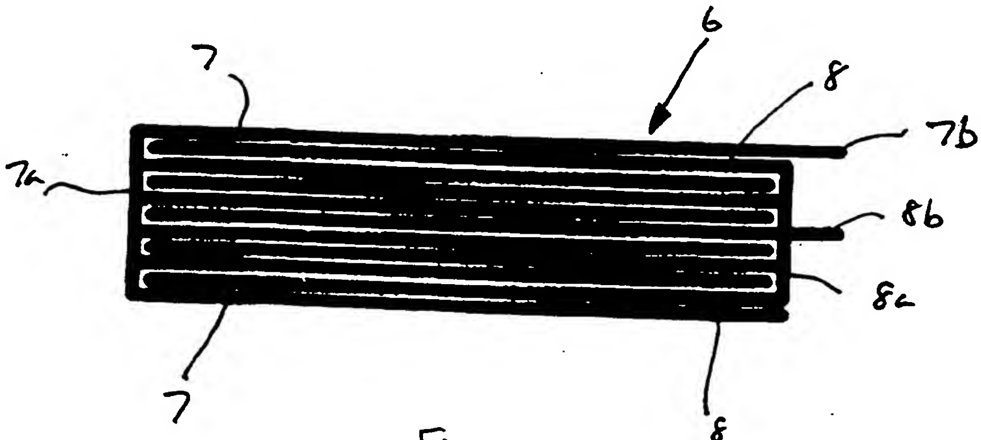


Fig.3

THIS PAGE BLANK (USPTO)

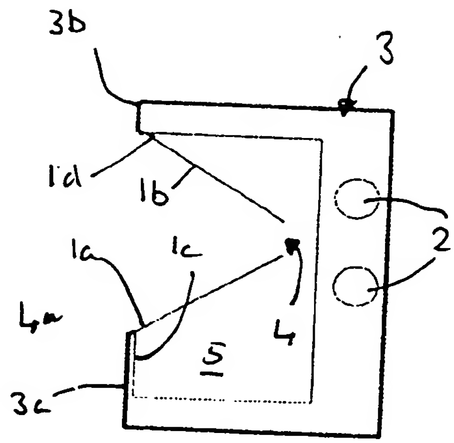


Fig. 4a

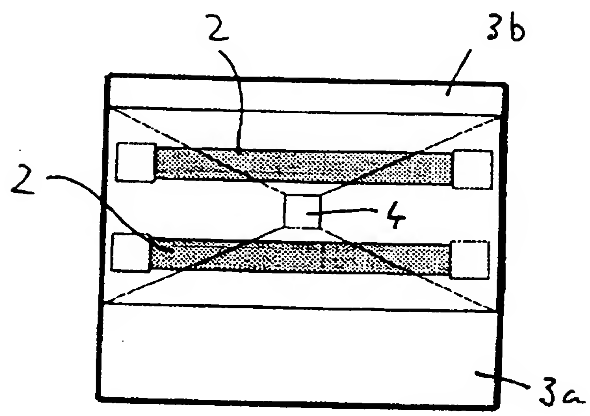


Fig. 4b

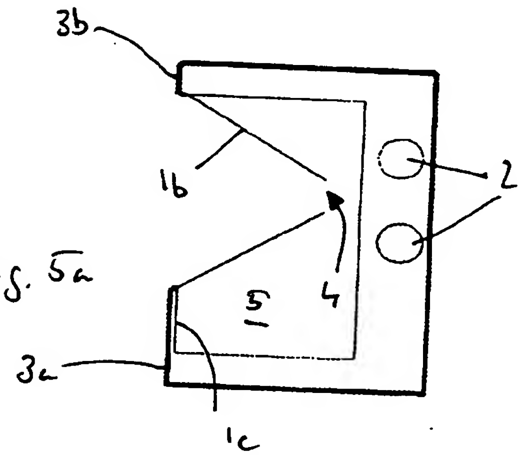


Fig. 5a

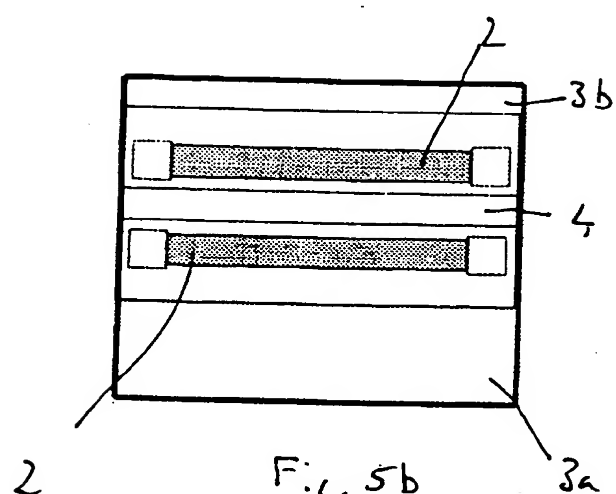


Fig. 5b

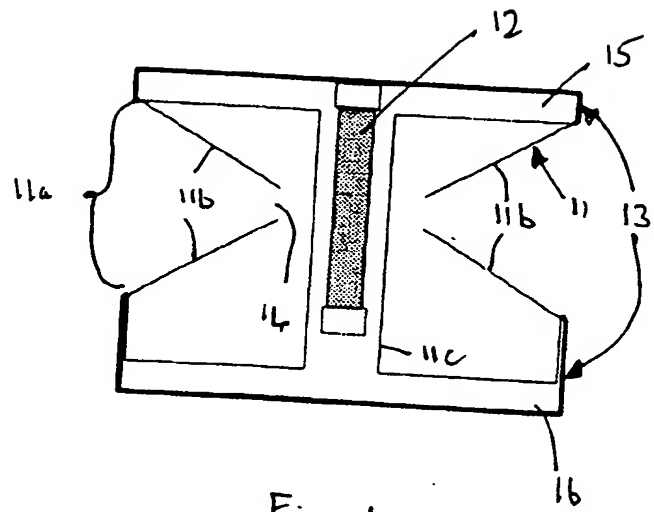


Fig. 6

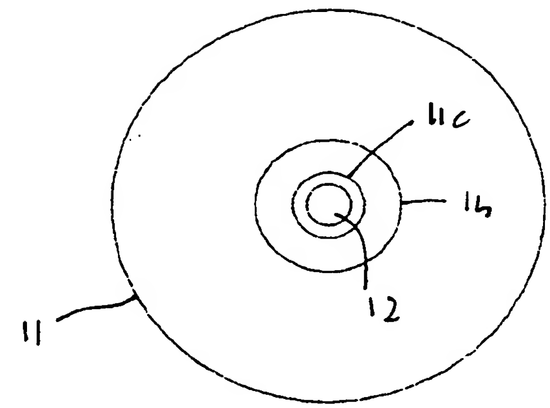
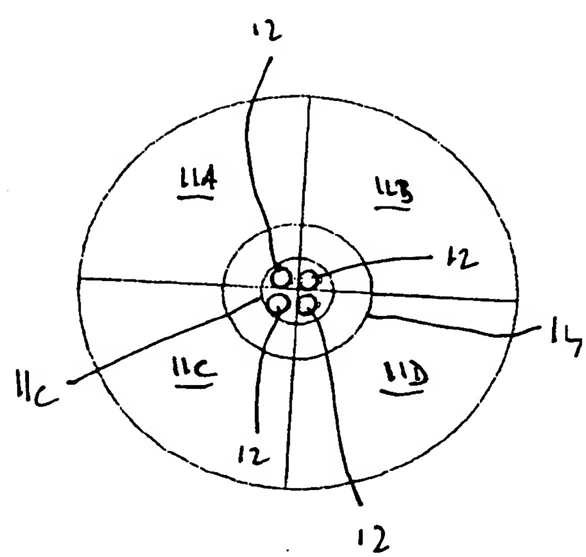


Fig. 8



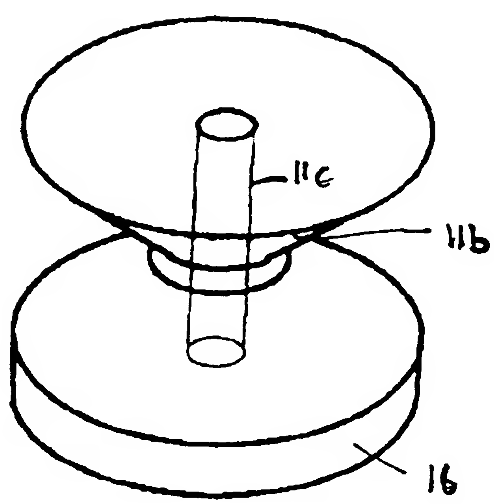


Fig. 7

PCT/GB00/03630

David Platt & Co

7 Parkhill Road

Sidcup

[illegible]

[illegible]

THIS PAGE BLANK (USPTO)

[illegible]